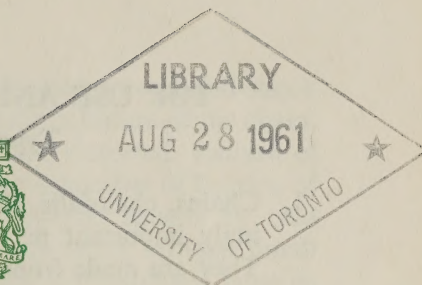


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THE USE AND CARE OF CHAIN

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**Hon. Michael Starr
Minister**

**George V. Haythorne
Deputy Minister**

THE USE AND CARE OF CHAIN

Types of Chain

1. Chains, chainfalls, slings etc., are taking an increasingly important part in the handling of materials. They are made from steel, wrought iron, and, to an increasing extent, alloy steel chain.
2. Low carbon steel chain has largely displaced wrought iron chain due, chiefly, to the fact that steel is more uniform than wrought iron. Advances have also been made in welding technique and equipment, particularly in the electric welding field. The proof tests of steel chain are invariably higher than iron chain and it is generally accepted that low carbon steel chain, as now made, is at least as satisfactory as iron chain for practically all purposes.

Inspection and Testing of Chain

3. The following details of inspection and testing should be followed after selecting the proper type for the specific work:
 - (a) Inspection should be made before any new chain is put into service, and at least every two months while the chain is in service or after a specific routine type of lift has been made. This inspection shall be carried out only, by individuals whose experience, ability, and judgment make them suitable for such work.

- (b) Every new chain should have the length of a predetermined number of links recorded.
- (c) Each link, also ring or hook, should be inspected for surface cracks or wear, and bent, deformed or gouged condition.
- (d) Any doubtful link, ring or hook, after inspection, shall be rejected. Such chain shall have attached to it immediately, a suitable tag condemning it for service.
- (e) Chain requiring replacement of links or other parts, should be returned to the maker for required repairs and regrading.
- (f) Identification numbers, also day, month and year of inspection, should be stamped on the flat surface of the identification link only, which should be a separately attached and not a working link.
- (g) A stretch or wear test should be made at each inspection period and the results recorded. To gauge for elongation, stretch or wear, the chain shall be hung on a crane or hook and, from it, a sufficient weight shall be suspended in order to take up the slack and keep all links in tension. If the increase in length, due to stretch or wear or both, exceeds 10 per cent of the length of the chain when new, such chain shall be discarded.

Care, Maintenance and Repairs

4. The following requirements must be observed in

order to maintain safety and efficiency in the use of chain:

- (a) Low carbon steel and iron chain shall be annealed at least every six months if service is continuous, or more frequently if service shows such treatment to be necessary.
- (b) Alloy steel chain shall not be heat-treated, normalized or annealed. The chain manufacturer should be consulted for advice concerning the best practice for the maintenance of alloy steel chain.
- (c) Chain should be stored in such places as will protect them from extreme cold or moisture, and, under no circumstances, will they be run over by trucks or other vehicles. It is common practice to protect chain, in storage, with oil and to lubricate load or block chain operating in pockets or over drums.

Safe Loads

- 5. The following requirements, relative to the loading of chain, shall be observed:
 - (a) In service, chain shall not be loaded beyond safe working loads. Badly over-stressed links lose their shape and are not as strong under impact as before being stretched. If chain is carefully measured as outlined in inspection instructions, any elongation which is not the result of wear is sure proof of overload.

(b) Chain shall not be subjected to repeated shock loads, as these may result in failure of the chain, even before the links are distorted. Failure of chain may be caused by a number of factors, of which surface embrittlement, caused by cold working, is probably the most serious. Small cracks are likely to form in a hardened layer or skin and be a starting point for progressive failure. This work-hardened layer or skin of varying thickness may be set up by:

- (i) Repeated abrasion of one link against another (inter-link action), in shock or normal loads, or
- (ii) Local impact on chain links while in normal use or not in use unless properly stored (see 4 (c)). This hard condition may be softened and returned to its original condition by periodic annealing or normalizing. However, to have beneficial effect this treatment must be carried out before cracks have formed.

General Rules

For safe usage, the following precautions should be observed by chain users:

1. Do not overload chain.
2. Do not cross, twist or kink chains or links.
3. Do not carry loads with excessive angles between legs of double sling chains.

4. Do not straighten a bent or twisted link.
5. Do not hammer or force chain into position.
6. Do not drag chain from under load.
7. Do not drop chain from any height or allow weights to fall on them.
8. Do not mark, nick or stamp a chain working link for identification.
9. Do not trust a chain with stretched or stiff links.
10. Do not use excessively pitted or corroded chain.
11. Do not carry a load on the point or tip of a hook.
12. Do not insert the tip of a hook in a chain link.
13. Do not apply sudden loads to chain, especially at low temperature.
14. Do not place chain over sharp corners without protective padding.
15. Do not forget frequent and careful inspection.

For greater detail in handling and caring of chains your attention is directed to: CSA B75-1947 published by Canadian Standards Association.

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